

# PATENT SPECIFICATION



841,537

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## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

#### A Hand Exercising Appliance

We, EDWARD BOLTON LIMITED, a British Company, of 23, Chilworth Mews, London, W.2., and EDWARD DE VALVE BOLTON, a British subject, of 23, Chilworth Mews, London, W.2., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to a hand exercising appliance intended for exercising and strengthening the main gripping muscle of the hand namely the flexor digitorum profundus.

15 Known appliances, usually in the form of gripping devices, have not been a complete success because they do not exercise the main gripping muscle through the full range of action. A device for use when playing 20 the pianoforte has been proposed, for purpose of exercising and strengthening certain muscles below the distal phalanges (the end finger joints) and the thumb, comprising rings each dimensioned to pass freely over 25 the first knuckle joint of the associated finger but not over the second joint, a divided and closable ring for engaging over the thumb above the joint thereof, a band adapted to be clamped over the wrist and 30 elastic tension cords connected across from said finger and thumb rings to the said wrist band, the cords associated with the fingers passing over the backs of the fingers whereas the cord for the thumb passes be- 35 low the thumb and across the palm of the hand.

40 The present invention has regard for the fact that the action of the flexor digitorum profundus is to flex the distal phalanges (the end finger joints) and, still acting, to curl up the fingers into the palm and finally, with the fingers so positioned, to cause certain flexion in the wrist joints.

The object of the present invention is to provide an improved form of hand exercising 45 appliance which avoids the drawbacks experienced with known devices and enables all four fingers of a hand to be exercised from full extension to full flexion and to ensure that the fingers act against smooth 50 and constant resistance through the entire range of movement from a finger extended position to a full flexion position, i.e. with the fingers clenched into a fist form.

55 Preferably, the appliance of this invention is also adapted to enable the thumb to be exercised at the same time as the fingers.

Broadly, according to the present invention, there is provided a hand exercising 60 appliance which comprises thumbes adapted to be engaged with the tips of the fingers and each fitted with means, adapted to extend along the back of the associated finger to a wrist engaging member, which serves 65 to transmit or apply to the associated thumb a load resisting the flexing movement of the said finger when the hand is clenched to form a fist.

To enable the invention to be clearly 70 understood embodiments thereof will now be described by way of example with reference to the accompanying drawings, wherein:—

Figure 1 is a side view of one form of the appliance fitted to a hand shown in the 75 unclenched position.

Figure 2 is a view similar to Figure 1 but showing the hand partly and fully clenched.

Figure 3 is a view of a weight carrying network used in conjunction with the 80 arrangement illustrated by Figures 1 and 2.

Figure 4 is a side view illustrating a second form of the invention, and

Figure 5 is a plan view illustrating a modification of the arrangement shown in 85 Figures 1 to 3.

Referring firstly to Figures 1 to 3, the means adapted to be engaged with the tips of the fingers and the thumb comprises individual thimbles 1 which fit over the ends or distal phalanges of the fingers, each thimble 1 having secured to it one end of a pliable wire, string or the like 2 which is guided freely through a plurality of tubular members 3 which are axially aligned. When the device is fitted to a hand, the said wire, string or the like extends along the back of a finger 4, the tubular members 3 being spaced apart slightly so that the spacings 5 between them coincide with the finger joints so that said joints can flex freely.

The other ends of the wires or strings 2 i.e. five strings for four fingers and one thumb 6 pass through an aperture or apertures 7 in a wrist band 8 and the ends thereof connected conveniently by a net-like harness 9 to a weight supporting element 10 upon which weights 11 of different denominations, according to the resistance to be overcome, are placed, the weights 11 preferably being slotted radially so that they can easily and quickly be slid into position on or removed from the weight supporting element 10.

It will be readily appreciated that when exercising a hand the wires or strings 2 are pulled when a hand is moved from the position (Figure 1) in which the fingers 4 are fully extended to a position (Figure 2) in which the fingers 4 are partly clenched and then fully clenched to form a fist and that this movement of the hand is effected against the influence of the weight 11 supported by the wires 2 by way of the network 9 and which, with the hand extended horizontally, is moved vertically.

It will be appreciated that the denominations of the weights can be varied and a range of exercises carried out wherein the weights are gradually increased as the exercises reach an advanced state.

The thimbles 1 may be constructed of leather, plastic or any other suitable material and the size of each thimble 1 is such that it more or less fits over each finger nail.

The tubes 3 may be of wood, metal or plastic and can, if desired, be made flexible.

The thumb 6 may be exercised independently through its own action of flexion, adduction and any opposition to the movement of the fingers.

The said netting 9 when extended is a diamond formation (Figure 3) with the base of the netting secured to the cords 2 extended through the wrist band 8 and the apex of the netting 9 fitted with a cord 9a carrying the weight receiving element 10. If desired, a tension spring may be inserted in the weight suspension means.

With the foregoing embodiment the

gravity of the weights 11 has to be overcome when the hand is clenched.

According to a modification however as illustrated by Figure 4 the hand may be clenched against the influence of coiled springs 12 which are fitted between said thimbles 1 and the wrist band 8 so that when one hand is clenched the finger flexing takes place against the influence of said springs 12, the weights 11 not being necessary. If desired, the arrangement provided by the previous embodiment and also that of this second embodiment may be fitted to the back of a glove.

According to a modification of the first embodiment and which is illustrated by Figure 5 the tubular members may be continuous and comprise sheaths of helically wound wire 3a having the coils close together, e.g. similar to curtain wires with the pulling wires 2 extending through said sheaths, the wires 2 passing through openings in the wrist band 8 and being connected to the weight supporting element by a net-like harness 9 as previously described. Two wires may be associated with each finger and thumb instead of one as described with reference to Figures 1 to 3.

This latter embodiment may also be fitted to the back of a glove.

According to another embodiment (not illustrated) elastic cords extend along the backs of the fingers and thumb from a wrist band and are fitted with thimbles for engaging the finger and thumb tips, wires being connected along the backs of the elastic cords for connection to a weight.

#### WHAT WE CLAIM IS:—

1. A hand exercising appliance comprising thimbles adapted to be engaged individually with the tips of the fingers and each fitted with means, adapted to extend along the back of the associated finger to a wrist engaging member, which serves to transmit or apply to the associated thimble a load resisting the flexing movement of the said finger when the hand is clenched to form a fist.

2. An appliance according to Claim 1, embodying additional means of the same form for engagement with the thumb and for controlling same in the said manner.

3. An appliance according to Claim 1 or 2, wherein the means adapted to extend along the back of each finger, (or each finger and the thumb) comprises a guided wire, string or the like, the wires extending through the wrist-engaging member and being connected to a weight constituting the resistance means when the hand is clenched.

4. An appliance according to Claim 3, wherein each wire is guided through axially aligned tubular members which are spaced apart to coincide with the finger joints.

5. An appliance according to Claim 3, 130

wherein each wire is guided through a helically wound wire anchored at its ends to a thimble and to the wrist-engaging member respectively.

5 6. An appliance according to Claim 3, 4 or 5, wherein the ends of the wires extending through the wrist engaging member are connected to the resistance weight by means of a net-like harness.

10 7. An appliance according to Claim 1 or 2, wherein the means adapted to extend along the back of each finger (or each finger and the thumb) comprises a coiled spring which is connected at its ends to a thimble and the wrist-engaging means respectively, the springs constituting the means which resist clenching of the hand.

15 8. An appliance according to Claim 1 or 2, wherein the means adapted to extend along the back of each finger (or each finger and the thumb) comprises an elastic cord which is connected at its ends to a thimble

and the wrist-engaging means respectively, the elastic cords carrying wires connected to a weight constituting the means which 25 resists clenching of the hand.

9. An appliance according to any of the preceding Claims fitted to the back of a glove.

10. A hand exercising appliance constructed substantially as hereinbefore described with reference to and as illustrated by Figures 1 to 3, 4 or 5 of the accompanying drawings.

Dated this 18th day of December, 1957. 35

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#### PROVISIONAL SPECIFICATION

#### A Hand Exercising Appliance

We, EDWARD BOLTON LIMITED, a British Company, of 23, Chilworth Mews, London, W.2., and EDWARD DE VALVE BOLTON, a British subject, of 23, Chilworth Mews, London, W.2., do hereby declare this invention to be described in the following statement:—

40 The present invention relates to a hand exercising appliance intended for exercising and strengthening the main gripping muscle of the hand namely the flexor digitorum profundus.

Known appliances, usually in the form of gripping devices, have not been a complete success because they do not exercise the 50 main gripping muscle through the full range of action and any resistance to the exercising action has not been variable and at the same time accurate.

55 The action of the flexor digitorum profundus is to flex the distal phalanges (the end finger joints) and, still acting, to curl up the fingers into the palm and finally, with the fingers so positioned, to cause certain flexion in the wrist joints.

60 The object of the present invention is to provide an improved form of hand exercising appliance which avoids the drawbacks experienced with known devices and enables all four fingers of a hand to be exercised 65 from full extension to full flexion and to ensure that the fingers act against smooth and constant resistance through the entire range of movement from a finger extended position to a full flexion position, i.e. with the fingers clenched into a fist form.

70 Preferably, the appliance of this invention is also adapted to enable the thumb to be exercised at the same time as the fingers. Broadly, according to the present inven-

tion, there is provided a hand exercising 75 appliance which comprises means adapted to be engaged with the ends or tips of the fingers and thumb and each fitted with means adapted to extend along the back of each finger and thumb to a wrist engaging 80 member for effecting a predetermined resistance to the flexing movement of the fingers and thumb when the hand is clenched to form a fist, said resistance means re-asserting themselves when the hand is subsequently 85 opened.

To enable the invention to be clearly understood embodiments thereof will now be described by way of example.

According to one embodiment the means 90 adapted to be engaged with the ends or tips of the fingers and the thumb comprises individual thimbles or sheaths which fit over the ends or distal flanges of the fingers and each thimble has secured to it one end of a 95 pliable wire, string or the like which is guided freely through a plurality of tubular members which are axially aligned and, when the device is fitted to a hand, extends 100 along the back of a finger, the tubular members being spaced apart slightly so that the spacings between them coincide with the fingers joints so that said joints can flex freely.

The other ends of the wires or strings i.e. 105 five strings for four fingers and one thumb pass through aperture or apertures in a wrist-band and the ends thereof connected conveniently by a net-like harness to a weight supporting element upon which weights of 110 different denominations, according to the resistance to be overcome, are placed, the weights preferably being slotted radially so

that they can easily and quickly be slid into position on or removed from the weight supporting element.

It will be readily appreciated that when exercising a hand the wires or strings are pulled when a hand is moved from the position in which the fingers are fully extended to a position in which the fingers are clenched to form a fist and that this movement of the hand is effected against the influence of the weight supported by the wires and which, with the hand pulled horizontally, is moved vertically.

It will be appreciated that the denominations of the weights can be varied and a range of exercises carried out wherein the weights are gradually increased as the exercises reach an advanced state.

Said thimbles may be constructed of leather, plastic or any other suitable material and the size of each thimble is such that it more or less fits over each finger nail.

The tubes may be of wood, metal or plastic and can, if desired, be made flexible. The thumb may be exercised independently through its own action of flexion, adduction and any opposition to the movement of the fingers.

The said netting when extended is a diamond formation with the base of the netting secured to the cords extended through the wrist band and the apex of the netting fitted with a cord carrying the

weight receiving element. If desired, a tension spring may be inserted in the weight suspension means.

With the foregoing embodiment the gravity of the weights has to be overcome when the hand is clenched. According to a modification however the hand may be clenched against the influence of coiled springs which are fitted between said thimbles and the wrist band so that when the hand is clenched the finger flexing takes place against the influence of said springs. If desired, the arrangement provided by the previous embodiment and also that of this second embodiment may be fitted to the back of a glove.

According to a modification of the first embodiment the tubular members may comprise sheaths of helically wound wire having the coils close together, e.g. similar to curtain wires with the pulling wires extending through said sheaths, the wires passing through openings in the wrist band and being connected to the weight supporting element by a net-like harness.

KINGS PATENT AGENCY LIMITED.

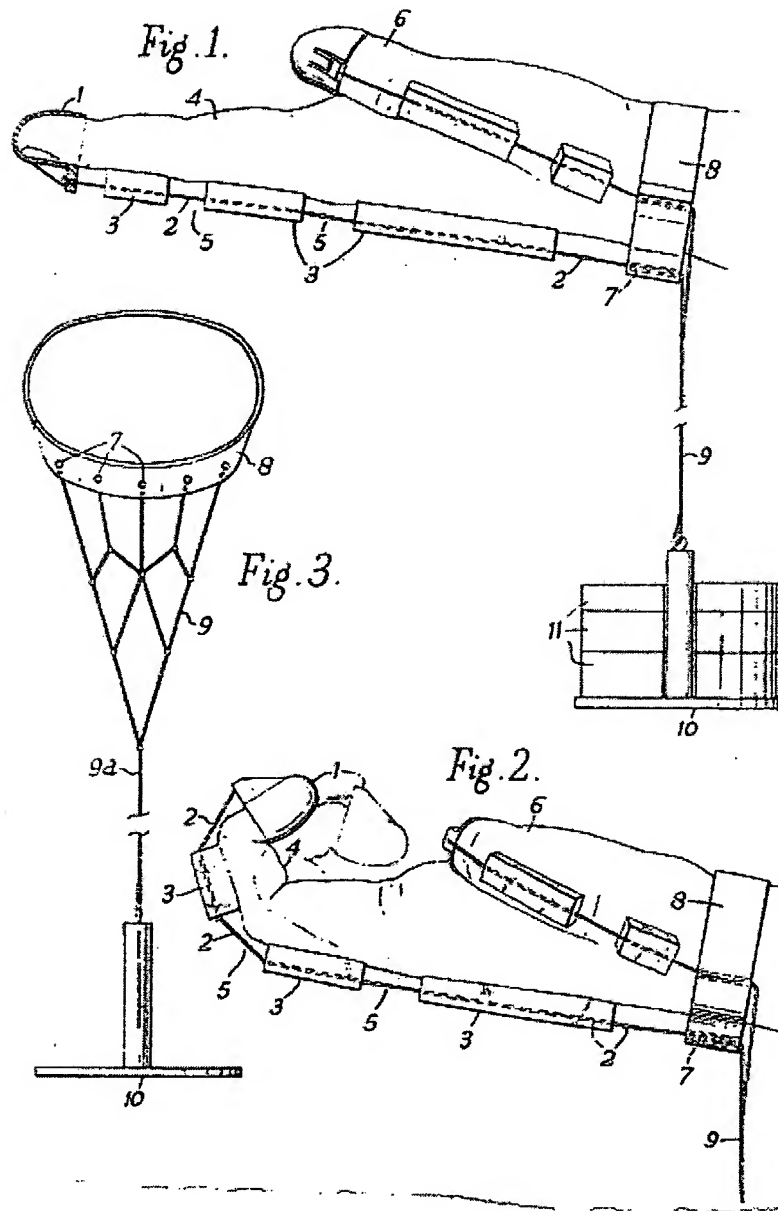
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841,537 COMPLETE SPECIFICATION

2 SHEETS

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the Original on a reduced scale.  
SHEETS 1 & 2

Fig. 4.

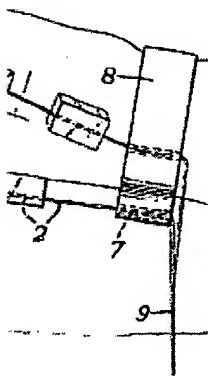
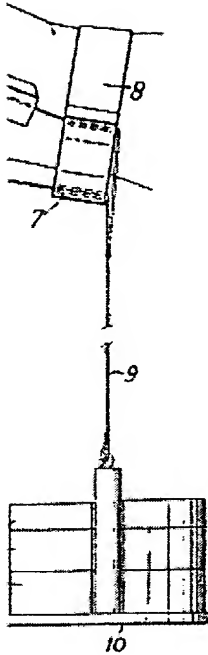
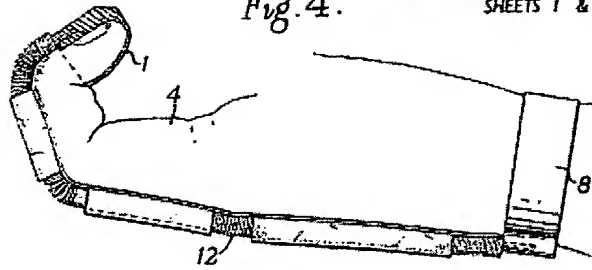
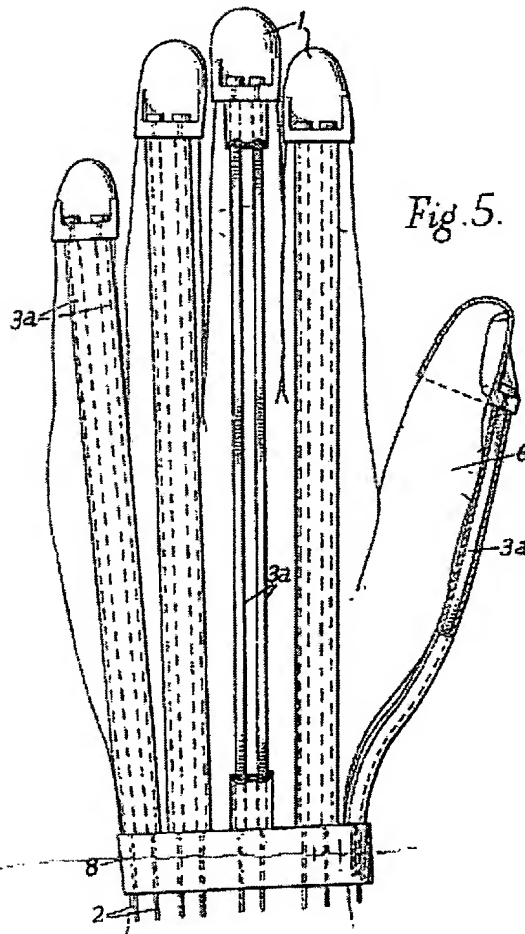


Fig. 5.



841,537 COMPLETE SPECIFICATION  
 2 SHEETS  
 The drawing is a reproduction of  
 the Original in a reduced scale.  
 SHEETS 1 & 2

Fig. 4.

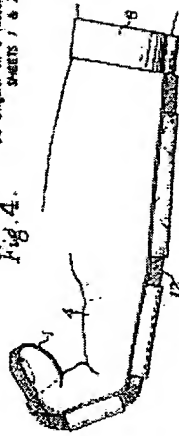


Fig. 5.

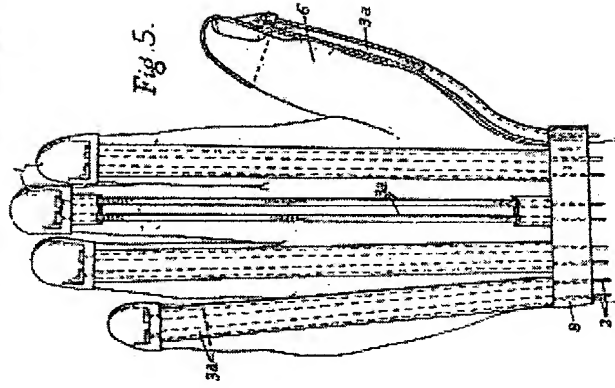


Fig. 1.

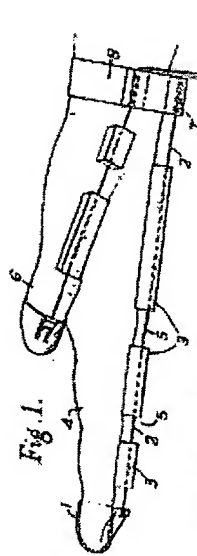


Fig. 3.

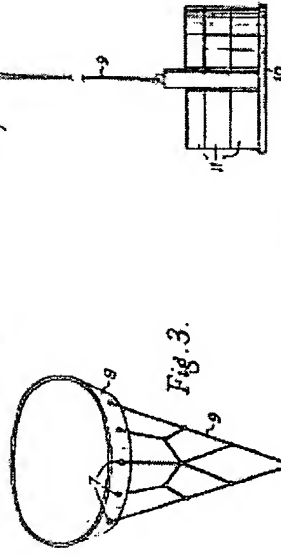
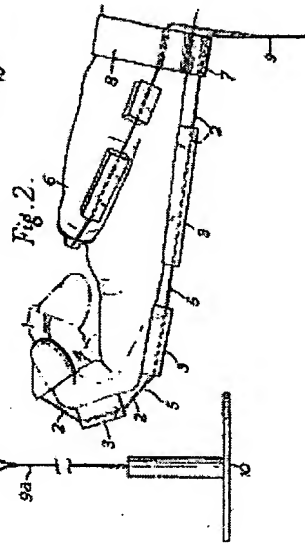


Fig. 2.



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